3.5 Ecological Resources

3.5.1 Introduction

This section provides a general discussion of the affected environment and environmental consequences to vegetative resources, vertebrate terrestrial wildlife, and aquatic species (vertebrates and macro-invertebrates). The subsequent sub-sections address the potential impacts to vegetative communities and specific groups of wildlife species (hereafter, includes both terrestrial and aquatic species unless specified).

Ecological baseline studies for flora and fauna were collected to fulfill the objectives specified in U.S. Nuclear Regulatory Commission (NRC) NUREG-1748, *Environmental Review Guidance for Licensing Actions Associated with NMSS Programs*. Ecological surveys were also conducted in accordance with applicable SD DENR, SD Game, Fish and Parks (SDGFP), and U.S. Fish and Wildlife Service (USFWS) guidelines. These agencies were consulted prior to initiating field surveys to ensure that adequate objectives, survey methodologies, and data collection techniques were employed.

3.5.2 Regional Setting

The permit area spans approximately 10,580 acres in Townships (T) 6-7 South (S), Range (R) 1 East (E) (Refer to Plate 3.5-1). Approximately 2,488 acres (23 percent) are expected to be disturbed by ISL operations associated with this project. The PAA is comprised primarily of private lands small portions of BLM lands and lies adjacent to parcels of USFS land. The current principal land use in the region is cattle grazing.

The permit area is within the mixed grass eco-region of the Northern Great Plains (EPA 1993), near the southwestern extension of the Black Hills. The elevation within the permit area ranges from approximately 3,600 feet to 3,900 feet above mean sea level, with the highest elevations along the pine breaks that overlap its eastern boundary. Topography in the permit area and surrounding lands is primarily gently rolling in the western quarter, with more varied terrain in the pine breaks and dissected hills that comprise the rest of the area.

3.5.3 Climate

The PAA is characterized as semi-arid continental or steppe with a dry winter season. The area commonly experiences low precipitation levels, high evaporation rates, low relative humidity, and plentiful sunshine. Temperatures are moderate, with large diurnal and annual variations, and extremes ranging from approximately -37 degrees F in the winter to 114 degrees F in the summer. The first freeze typically occurs in mid- to late September, with the last freeze often recorded during late May. Yearly precipitation totals average about 14 inches. Approximately one-half of the annual precipitation falls during the months of May, June, and July. As expected, most of the winter precipitation occurs as snow, with an annual average of 37 inches. Thunderstorms are relatively frequent in the PAA during the summer months, averaging 40-45 days per year. Much of the annual rainfall is associated with these events.

Windy conditions are fairly common in the PAA, generally averaging 10 mph. Prevailing winds come from the west-northwest during much of the year, though east-southeast winds are also common.

3.5.4 Baseline Data

Vegetation sampling was conducted by BKS Environmental Associates, Inc. (BKS) of Gillette, Wyoming. Initial surveys were conducted during July 2007, with supplemental sampling performed to adjust to subsequent changes in the PAA boundary. Wildlife and aquatics sampling were conducted by ICF Jones & Stokes (formerly Thunderbird-Jones & Stokes), of Gillette, Wyoming from July 2007 through early August 2008 to meet agency requirements of one year of baseline data, and to accommodate changes to the PAA boundary during that period.

The overall PAA (license area and surrounding perimeter) is located within the Cheyenne River watershed. Two main stream channels pass through the PAA: Beaver Creek (perennial) and Pass Creek (intermittent). Both flow south into the Cheyenne River, which runs from west to east approximately 2.5 miles south of the PAA boundary. A few small stock reservoirs are scattered throughout the area, though they may not retain water year-round.

Trees are present along the riparian corridors of both primary creeks, and on the higher elevation hilltops in the PAA. The plains cottonwood (*Populus deltoides*) was the only tree present along the creek channels, and was more prevalent in the Pass Creek corridor. Ponderosa pine (*Pinus ponderosa*) dominates the higher elevation hilltops and breaks in the central and eastern portions of the PAA, with Rocky Mountain juniper (*Juniperus scopulorum*) present as individual trees or small inclusions in some of the dry drainages.

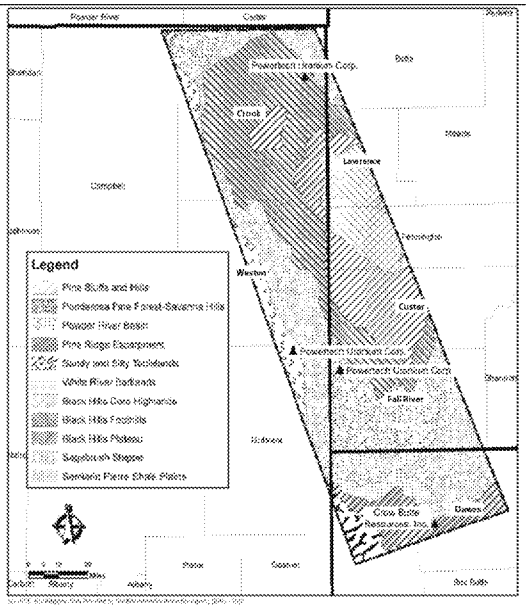


Figure 3.6-1. Ecoregions for the Nebraska-South Dakota-Wyoming Uranium Milling Region
Source: NRC (2009a)

This figure from the NRC SEIS shows the large scale eco regions for context.

The next slide shows the vegetative communities from the Powertech Environmental Report and the NRC SEIS.

The Dewey-Burdock Environmental Report Plate 3.5-1 is a map of vegetation communities in the permit area

From Powertech's Environmental Report

Table 3.5-1: Acreage and Percent of Total Area for Each of the Map Units

Map Unit	Permit area	% of Area	1/2 Mile Buffer Area	% of Area
Sampled Vegetation Communities				
Big Sagebrush Shrubland	2,501.56	23.70	2,639.45	31.75
Greasewood Shrubland	2,190.45	20.75	837.66	10.07
Ponderosa Pine Woodland	2,183.76	20.69	2,036.58	24.49
Upland Grassland	2,187.56	20.72	2,027.18	24.38
Cottonwood Gallery	240.6	2.28	103.13	1.24
Described Vegetation Communities				
Agricultural Land	780.79	7.40	604.39	7.27
Disturbed	14.7	0.14	--	--
Existing Mine Permit	326.99	3.10	--	--
Silver Sagebrush Shrubland	119.49	1.13	55.65	0.65
Shale Outcrop	2.19	0.02	--	--
Water	8.94	0.08	12.6	0.15
TOTAL	**10,557.03**	**100.00**	**8,314.44**	**100.00**

Seven different plant communities were identified for the PAA:

1. Big Sagebrush Shrubland (BS),
2. Greasewood Shrubland (GW),
3. Ponderosa Pine Woodland (PP),
4. Upland Grassland (UG),
5. Cottonwood Gallery (CG),
6. Silver Sagebrush Shrubland (SS), and
7. Agricultural Land (AG),

From NRC SEIS

Table 3.6-1. Total Acreage of Vegetation Communities and Percentage of Permit Area

Vegetation Community/ Land Use	Permit Area (Hectares)	Permit Area (Acres)	Percent of Permit Area
Big Sagebrush Shrubland	1,012.34	2,501.56	23.70
Greasewood Shrubland	886.44	2,190.45	20.75
Upland Grassland	885.27	2,187.56	20.72
Ponderosa Pine Woodland	883.74	2,183.76	20.69
Agricultural Land	315.97	780.79	7.40
Cottonwood Gallery	97.37	240.60	2.28
Silver Sagebrush Shrubland	48.35	119.49	1.13
Disturbed	5.95	14.70	0.14
Existing Mine Pits	132.33	326.99	3.10
Shale Outcrop	0.89	2.19	0.02
Water	3.62	8.94	0.08
TOTAL	**4,272.27**	**10,577.03**	**100.00**

Source: Powertech (2009a)

The permit area is comprised of five main vegetative communities, in descending order:

1. Ponderosa Pine Woodland,
2. Big Sagebrush Shrubland,
3. Greasewood Shrubland,
4. Upland Grassland, and
5. Cottonwood Gallery.

Interspersed among those primary habitats are smaller inclusions of Silver Sagebrush Shrubland, Agricultural Land, creek channels, and numerous ephemeral draws.

Sprague's Pipit

NRC SEIS Section 4.6.1.1.1.1.4 Threatened and Endangered Species

SEIS Section 3.6.3 explains that Sprague's pipit (*Anthus spragueii)* could potentially occur in the proposed project area in the upland grassland vegetative community. Based on the information provided in SEIS Section 3.6.3, NRC staff conclude that it is unlikely this species will breed within the proposed project area. In addition, the Sprague's pipit will likely avoid areas near roads, grasslands that have been cultivated, or near the edges of other vegetative community types (FWS, 2011). Because the primary breeding area for this species is north and northeast of the project area and the birds spend winters in the southern half of the United States, NRC staff believe it is reasonable to expect that individual birds may occur in the project vicinity during migration. NRC staff conclude that it is unlikely Sprague's pipit will choose to inhabit the proposed project areas during the proposed ISR facility lifecycle; therefore, direct effects to the species are not expected. NRC staff further conclude that construction activities will not affect the existence of the species' population in the proposed project area.

State rare raptor species

NRC SEIS Section 4.6.1.1.1.4 Threatened and Endangered Species

State rare raptor species observed in the project area were Cooper's hawk, long-eared owl, and merlin. Each species is also protected under the MBTA. All raptors that occur at the proposed project site will experience potential impacts similar to those described for raptors in SEIS Section 4.6.1.1.1.2. Raptors are particularly sensitive to noise and the presence of human activity, which will be heightened during the construction period. As described in SEIS Section 4.6.1.1.1.2, injury and mortality from encounters with power lines will be minimized by the applicant's proposed use of raptor deterrent products and following regulatory timing and spatial restrictions with respect to construction activities near raptor nests. The applicant has also committed to follow an FWS-approved raptor monitoring and mitigation plan to minimize conflicts between active nest sites and project-related activities if direct impacts to raptors occur (Powertech, 2009a). Nest abandonment and loss of eggs or fledglings could occur in raptor nests proximate to construction activities, especially during the early nesting period. Because of the presence of raptors within the proposed project area, sensitive and rare raptor species could be disturbed. However, the NRC staff conclude direct impact to raptors is unlikely and the continued existence of the species in the proposed project area will not be threatened due to proposed mitigation measures; these are further detailed in Chapter 6 and include best management practices for monitoring species.

Whooping cranes

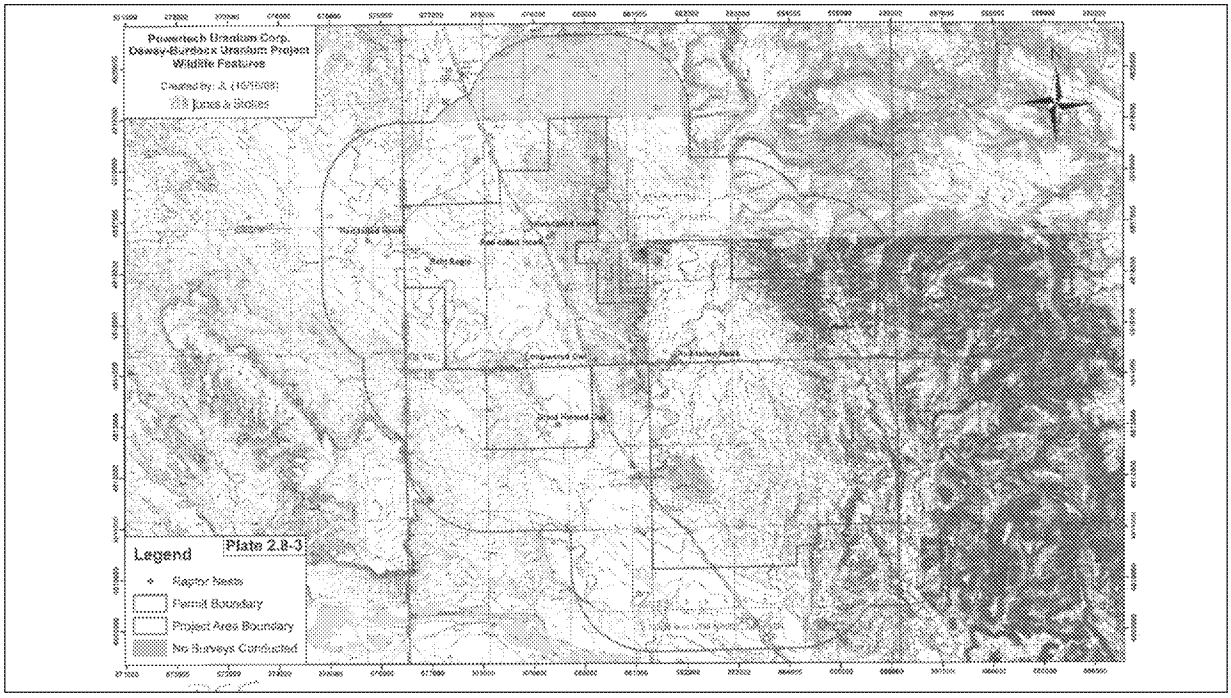
Whooping cranes *(Grus americana)* currently do not breed in South Dakota; however, the proposed project area is located west of the migration path between Texas and Canada (FWS, 2009). Although construction activities may not directly impact whooping cranes, the potential exists for whooping crane disturbances from proposed mining activities during spring and fall migrations (FWS, 2010). Cranes roost, rest, and forage in relatively shallow wetlands that occur on the proposed project site along Beaver Creek, parts of Pass Creek, mine pits, and depressions, but prefer sites with minimal human disturbance (FWS, 2009). Construction activities at the proposed project may indirectly impact migrating whooping cranes by reducing optimal or preferred resting habitat. NRC staff conclude that migrating whooping cranes will not likely occur at the proposed site based on their traditional migratory pathway (FWS, 2009). If cranes navigate west of the traditional migratory pathway, NRC staff conclude that it is likely cranes will select other appropriate habitat for roosting, resting, and foraging during the proposed ISR facility lifecycle, and that construction activities will not affect the existence of the species' population in the proposed project area.

From Powertech's Environmental Report prepared for the NRC SEIS,

3.5.5.3 Wildlife, 3.5.5.3.1 General Setting

Current baseline wildlife information was collected for the Proposed Action from July 2007 through early August 2008. The survey area included the entire PAA (current as of September 2008), with additional surveys conducted on adjacent lands and in nearby riparian areas for certain species of concern. Due to changes in the PAA boundary after completion of the field surveys, a small portion of the northern-most perimeter was not included in the baseline surveys (refer to wildlife map). However, because those surveys were conducted in representative habitats throughout the PAA, and no new habitat types were included in expanded perimeter, it is the professional opinion of ICF Jones & Stokes that no information was lost for any unique or critical data by not having conducted certain surveys in the limited excluded portion of the one mile perimeter. That area can be included in any future monitoring required by the SDGFP as a condition of future permitting actions, at their discretion.

Survey protocols and timing were developed collaboratively with SDGFP to meet species specific requirements. The survey area included the PAA and one-mile perimeter for threatened and endangered (T&E) species, bald eagle winter roosts, all nesting raptors, upland game bird leks, and big game. Surveys conducted only in the PAA included other vertebrate species of concern tracked by the SDNHP, as well as bats, small mammals, lagomorphs, prairie dog (*Cynomys* spp.) colonies, breeding birds, predators, and herptiles (reptiles and amphibians). Aquatic sampling occurred at water gauge stations located in Beaver Creek upstream of the PAA, and in Beaver Creek and the Cheyenne River downstream of the area. In addition to these targeted efforts, incidental observations of all vertebrate wildlife species seen within the PAA were recorded during each site visit during the year-long baseline survey period. Surveys for black-footed ferrets (*Mustela nigripes*) were not required for this project due to a block clearance issued by the USFWS that includes the entire PAA and vicinity.


Powertech Uranium Corp.
Dewey-Burdock Uranium Project
Wildlife Features
Created by: JL (10/17/08)
JR Jones & Stokes
Legend
Plate 2.8-3
Raptor Nests
Permit Boundary
Project Area Boundary
No Surveys Conducted

MITIGATION MEASURES

Mitigation Measures in NRC SEIS:

- Following recommended fencing and power line construction designs will minimize impediments to game and avian movement (Executive Summary).
- Buildings and other structures will be painted so they blend in to the natural landscape, and power lines and pipelines will be buried where appropriate (Executive Summary).
- Electrical power to the header houses will be delivered by overhead power lines and buried cable. Electrical power to individual wells will be delivered by buried cable from the header house. (Section 2.1.1.1.2.3.7)
- Portions of the proposed Dewey-Burdock ISR Project site will be disturbed during construction activities; therefore, some birds will be displaced and some temporary habitat loss will occur (Section 4.6.1.1.1.1.2).
- The applicant commits to
    - (i) minimize disturbance of surface areas and vegetation, where possible;
    - (ii) minimize construction of new access and secondary roads so more than one drill site can be accessed; and
    - (iii) construct new roads, power lines, and pipelines in the same corridors to the extent possible to reduce overall disturbance and minimize new surface disturbance (Powertech, 2009a).
- All lands disturbed by project activities will be concurrently revegetated following approved reclamation practices (Powertech, 2009a), which will restore the habitat loss experienced from proposed construction activities.
- In addition, the applicant has committed in its application to adhere to regulatory timing and spatial restrictions (noise, vehicular traffic, and human proximity) as a mitigative measure that will decrease impacts during breeding season (Powertech, 2009a).

IMPACTS

NRC SEIS Section 2.1.1.1.2.3.6 Pipelines

The applicant proposes to install up to eight underground pipelines between the Burdock central processing plant and the Dewey satellite facility to transport various fluids used during ISR operations (Powertech, 2011). Conduits for electronic communication and control purposes will also be installed between the central plant and satellite facility. The plant-to-plant pipelines will transport fluids including but not limited to (i) barren and pregnant lixiviant, (ii) restoration water, (iii) reverse osmosis reject brines, (iv) wastewater from well drilling and maintenance operations, and (v) supply water from the Madison Formation or other aquifers.

NRC SEIS Section 2.1.1.1.2.3.7 Power Lines

The applicant plans to use existing power line corridors wherever possible when constructing new power lines. However, a new power line corridor will be constructed alongside Dewey Road between the Dewey and Burdock areas to connect the Dewey satellite facility and the Burdock central processing plant. This proposed corridor will be approximately 9 m [30 feet] in width; the poles will be approximately 0.3 m [1.0 ft] in diameter and will be placed every 30–91 m [100–300 ft]. No access roads will be built during construction of the power lines and minimal disturbance to the ground surface is anticipated.

Section 4.6.1.1.1.1.2 Avian collision and electrocution with overhead power lines could occur year round. The potential for eagle collisions with electric transmission lines is considered to be low because their foraging behavior is relatively slow compared to falcons and other raptors.

Table 4.6-3. BLM Recommended Seasonal Wildlife Stipulations

Affected Areas/Species	Activities and/or Timing Restriction	Restricted Area
Sharp-tailed grouse/greater prairie chicken	Surface use prohibited March 1–June 15 except for operations and maintenance	Within a 3.2-km [2-mi] radius of a lek in nesting/brood-rearing habitat*
	Prohibit surface disturbance/occupancy or human activity year round	Within a 0.4-km [0.25-mi] radius of an occupied lek*
	Siting structures that are more than 3 m [10 ft] tall or power lines	Within a 3.2-km [2-mi] radius of nesting areas
Peregrine falcon	Prohibit surface disturbance/occupancy or human activity year round	Within 1.6-km [1-mi] radius of a nest including nests recorded during the preceding 7 breeding seasons*
Bald eagle	Prohibit surface disturbance/occupancy or human activity year round	Within a 0.8-km [0.5-mi] radius of a nest including nests recorded during the preceding 5 breeding seasons*
Golden eagle, osprey, burrowing owl, ferruginous hawk, Swainson's hawk, prairie falcon, other raptors	Prohibit surface disturbance/occupancy or human activity year round	Within a 0.4-km [0.25-mi] radius of occupied nest*

Table 4.6-3. BLM Recommended Seasonal Wildlife Stipulations (Cont'd)

Affected Areas/Species	Activities and/or Timing Restriction	Restricted Area
Greater sage-grouse	December 1–March 31	Within crucial winter range for greater sage-grouse. Routine maintenance, production, and emergency response activities are allowed.*
	March 1–July 1	Within a 3.2-km [2-mi] radius of a lek in general habitat areas. Routine maintenance, production, and emergency response activities are allowed.*
	Prohibit surface disturbance/occupancy or human activity year round	Within a 0.4-km [0.25-mi] radius of an occupied lek*
Piping plover	Prohibit surface disturbance/occupancy or human activity year round	Within a 0.4-km [0.25-mi] radius of piping plover habitat*
Interior least tern	Prohibit surface disturbance/occupancy or human activity year round	Within a 0.4-km [0.25-mi] radius of wetlands identified as least tern habitat*
Big game winter ranges	December 1–March 31	Surface-disturbing and disruptive activities in winter ranges*

*The authorized officer may grant an exception, modification, or waiver to a stipulation based on certain criteria

Source: BLM, 2012b,c,d